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POLLINATION OF THE ERICACEAE: VI. VACCINIUM CAESPITOSUM ON MT. KATAHDIN[1]

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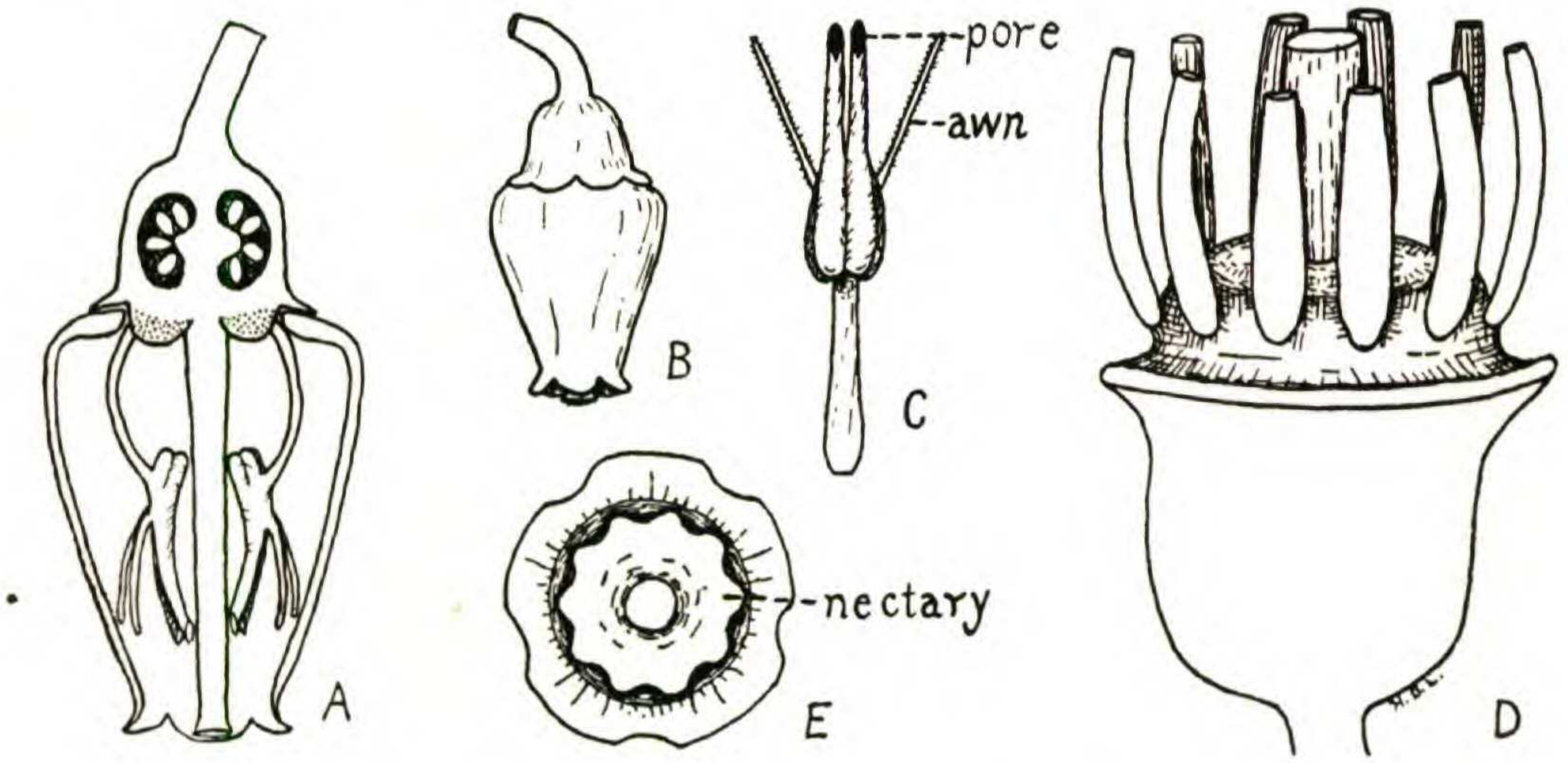
The long awns and slender anther-tubes together with the method of nectar secretion make *Vaccinium caespitosum* Michx. one of the most specialized flowers in the Heath Family. Although the related species, *V. uliginosum*, has been studied in Europe, there do not appear to be any published observations on the anthesis and insect visitors of the present species. *V. caespitosum* grows abundantly on the higher slopes of Mt. Katahdin above the tree line, where in spite of the inclement weather it sets fruit abundantly. Each leafy shoot produces a single nodding flower at the first node and the remaining leaves of the shoot almost completely conceal the flower from above. On steep slopes the side of the corolla exposed to the light is pink, whereas that next to the hillside remains white.

The five-merous flowers have a slender corolla-tube 5 to 5.5 mm. long which tapers down to 1.5 mm. in diameter at the apex. Since the stigma partially closes this opening, the nectar is rendered inaccessible to all but long-tongued insects. The corolla is very firm and tough. The capitate stigma, which stands just inside of the mouth of the flower, is very glutinous and pollen clings to it readily. Around the base of the style there is a thick, green ring, evidently the nectary, although in most cases little nectar was found on it (Fig. 1, A, E), a lack which will be discussed later. Inserted on the margin of the nectary and base of the corolla are the ten stamens. In many flowers the corolla fell off leaving the stamens still attached to the

[1] Contribution from the Biology Department, University of Louisville.

nectary (FIG. 1, D). Each stamen consists of a slender hairless filament and an anther which terminates in a pair of long slender tubes (FIG. 1, C). Each tube opens by an oblique pore which rests against the style in such a way that the pollen is retained until the tube is displaced. From the back of each anther a pair of long slender awns extend nearly to the corolla-tube. The surfaces of the awns are minutely roughened.

A great deal of nectar was found between the filaments and the base of the corolla. Some of the flowers were a third full of the liquid which was clearly visible through the translucent corolla. The nectar is secreted by the margin of the nectary and escapes between the bases of the filaments, a condition similar to that



found in *V. Myrtillus* L. of Europe and in *V. uliginosum*. This position of the nectar is correlated with the hairless filaments and the presence of awns. In *V. Vitis-idaea*, var. *minor*, a species which lacks awns, the nectar is retained in the center of the flower by a circle of hairy filaments. The habits of the insect visitors are different in the two species. In the latter they probe between the anther tubes and the style and so release the pollen by pushing the pores away from the style. In *V. caespitosum* the awns play an important role in pollination. While sucking up nectar lying outside the filaments in an awnless flower, the tongue of a visitor would rarely displace the anther tubes. The projecting awns, however, furnish an obstruction which cannot be avoided, and when struck by an insect's tongue, are certain to pull aside the pores sufficiently to release the pollen. When

such an insect with its mouth parts dusted with pollen visits another flower, these organs strike the stigma first, and thus the process of cross-pollination is completed.

It is possible that self-pollination may occur by the falling of the pollen upon the glutinous stigma, especially when the flowers are shaken by the high winds of the mountain top.

The base of the corolla is conspicuously thickened and very succulent (FIG. 1, A) suggesting that it too may secrete nectar.

Bumblebees belonging to three species were the only visitors and they are all species common in northern New England at low elevations and not, as had been hoped, Arctic forms. They were observed, however, to work under conditions of high wind and dense fog which would have ordinarily stopped visits. The concealed position of the flowers beneath the leaves made them difficult to approach by flying insects, bumblebees often falling on the ground and being obliged to crawl up to the flowers. When they reached a flower, they seized it roughly with their anterior legs, thrust in their tongue and pivoted around the flower upside down. Many of the flowers had their tips chewed off by the bumblebees, a mutilation which probably did not seriously interfere with pollination. The exceptionally abundant nectar proved ample attraction, and the flowers were visited repeatedly, especially by *Bombus terricola*.

The following insects were collected on Mt. Katahdin, Maine, at altitudes of 4200 to 4600 feet from July 14 to 16, 1937, and on July 27, 1941, all sucking nectar.

HYMENOPTERA. Apoidea. *Bombus terricola* Kirby 9 ♀ ; *B. vagans* Sm. 1 ♀ ; *B. ternarius* Say 3 ♀ .

LOUISVILLE, KENTUCKY.

BERULA **pusilla** (Nutt.), comb. nov. *Sium pusillum* Nutt. in Torr. & Gray, Fl. N. Am. i. 611 (1840). *S.* ? *incisum* Torrey in Fremont, Rep. Expl. Rocky Mts. 90 (1845). *S. angustifolium* sensu Am. auth., not L. *B. augustifolia* sensu Am. auth., not Mert. & Koch. *B. erecta* sensu Coville in Contrib. U. S. Nat. Herb. iv. 115 (1893), not *Sium erectum* Hudson, basinym. *S. Novae-Mexicae* Koso-Poljansky in Bull. Soc. Nat. Moscou, n. s. xxvii. 173 (1915).

The North American plant has generally been treated as specifically identical with the Eurasian *Berula erecta* (Huds.)